

Prologue

At first I was not sure what Harry meant when he said “the shore turns the ship” (Field note 11.10.18). He has been sailing on a push boat for 41 years, the last 20 or so as captain. Both Harry and later the captain of the rotating shift, Pat, used this phrase as we sailed on the *Tigris* from Duisburg to Rotterdam and back. At the time, in the autumn of 2018, we were experiencing record low water levels, which narrowed the river and brought the shore ever closer. As a result, we pushed four barges instead of six. At around 25 metres wide and 180 metres long, we were still one of the larger vessels on the river. The push boat itself, with its two huge engines, lay deeper in the water than most: at times our propellers were just 20 centimetres from the river bed. It was explained to me that if they got too close, the suction would dig them in. A large rock could also have been our undoing. Whenever a ship came close, the engines were switched off. The faster a ship goes, the more water it displaces. Aboard the *Tigris*, the fear was that the other ships would take what little water we had left.

This was to be my last voyage on the Rhine. It was never my intention to leave the shore and join ships, but how people (both in the control room and on board) live at the limits of what can be planned gradually became the subject of this study. So it was only fitting that my research should take some unexpected turns. The question that preoccupied me became: how is near-permanent mobility organised in an otherwise largely sedentary society? By then it was clear that nautical media were an important part of the answer.

Many have given up the transient life on board, and ships are depopulating, but some have found a way to stay in touch. One way is to become an operator in an inland waterway control centre, most of which are run by Rijkswaterstaat, the Dutch government’s “infrastructuring” (Star 2006) agency. Dirk, a skipper-turned-operator, was quoted by a nautical industry magazine at his retirement party as saying that he never wanted to enforce state authority, but to serve skippers (cf. Spek 2003).

My intention was to conduct an ethnography of a particular control room in Dordrecht, east of Rotterdam, located on a peninsula called Devil’s Island at the confluence of four rivers. Its elevated position offers a panoramic view of the waterscape, with radar and CCTV completing the picture. Skippers call in on marine VHF ra-

dio and operators organise passage through what is probably the busiest waterway junction in the world.

The first time I entered this control room, in the spring of 2015, I was almost immediately sent on another mission. To my knowledge, I was the first independent researcher in this control room. I used this fact to gain the trust of the operators, as I was told by a former manager of the control room that they were particularly wary of researchers. One operator asked me if I was going to find out why their peninsula had the name it had? If it meant anything to them, I would find out why it was called Devil's Island, I decided. As well as gaining legitimacy, I hoped to find out more about the rivers they oversee, as the history of land and water is so closely intertwined in the Netherlands.

This dissertation consists of several movements which, when combined, form a rarely seen picture of infrastructure, nautical media, mobility and work as observed (ethnography), recorded (archives), represented (public media) and retold (oral history). The first movement is from ethnography to historiography. This diachronic perspective is then transported back into the present: the second movement is to return to the control room, now understanding that lived present as an "überlieferte Ordnung" (Schmidt cit. in Wietschorke 2010). However, I soon realised that staying in Dordrecht and focusing on local interactions would reinforce the physical and organisational isolation of this control room. The third movement is therefore in a synchronic direction. I started by visiting the other control rooms, hopping along the main infrastructural axes Rotterdam-Duisburg and Rotterdam-Antwerp. Then I joined ships to experience the interaction from the water. Embarking on ships became a *scaling* experience, where gradually the sum of interactions, of localities, would bring the infrastructure as network into view.

In 2015, I cornered the eminent academic Christian Heath at a conference. Together with Paul Luff, he had carried out pioneering studies of control rooms, as detailed in *Technology in Action* (2004). I told him about my field and my suspicion that there was something beyond that control room in Dordrecht, that I needed to travel further to understand the practice that had materialised there. He listened to me, then politely said that he disagreed and urged me to take a camera and zoom in on the action. That was all I needed to hear, I would prove him wrong.

In fact, my field would prove him wrong. Looking back, I decided then that the field itself should guide the research. If I wanted to understand the way operators see the world, rather than impose my theoretical structures on them, I would have to let them design the map I could survey. Nor could I impose my method on them. For example, filming their actions, as Heath suggested, would have drawn uncanny parallels with the research commissioned by Rijkswaterstaat. The work of the operators had been observed in detail in order to quantify the intensity of their work, which in the eyes of the operators was then used to justify or instigate budget cuts. Hence their distrust in those observing them and their work.

It often seemed that the only stable thing in the field was change and the ability to navigate it. Roughly three things changed considerably and consistently: 1) the way in which control room work is learnt and carried out, 2) despite regulation, the river is alive and therefore constantly changing, 3) this is best experienced from the water, by those who are constantly on the move.

Dealing with change, I thought, was a skill to be learnt. If I exposed myself to it, I would get a glimpse of the experience of those in the field, perhaps I would become better at dealing with ever-changing circumstances. Gradually, my fieldwork became entangled with a transnational life of my own, oscillating between several countries, between old friends and new colleagues, between loyalty and ambition, between curiosity and anxiety.

The idea of going on board came from the operators. They suggested that I would only understand the river, the interaction between the control room and the ships, and the mobility the operators were trying to facilitate, if I went on a few trips myself. It was also recommended that I then join different types of vessels, as their rhythm, manoeuvrability and regulatory framework varied. Many of the operators had been skippers before, but had settled for a life on land. Being an operator was a way of staying in touch with the water, as they often put it, and one of the few places where their maritime expertise had value. The cohort of new operators I followed through their simulator training were also expected to join ships and complete tasks involving interaction between the control room and the ship. Harry had welcomed many of them on board. Due to their size, push boats need to anticipate traffic much earlier, making them more dependent on mediated vision. As in the control room, it is no longer sufficient to scan the water surface optically. These vessels also have the capacity to accommodate guests. Their larger crews have individual cabins, and the owner's cabin is regularly vacant, as most push boats are owned by shipping companies that have entire fleets.

Boarding the push boat, or any ship for that matter, was not easy. I had to adapt to the ship and its practices. I had shared my ambition to join a push boat during several visits to different control rooms. Jan, a control room operator who had sailed on one in the 1970s, was a childhood friend of Harry's. Jan had just finished a two-hour stint of intense ship coordination. After rotation, we sat behind a console where administrative tasks are carried out. Without my asking, Jan called Harry. He walked away first. I could hear them catching up like old friends. Then he returned to the desk and explained my research, I wrote down some details which he added to the conversation. Harry was convinced, but said it was not his decision. He gave me the number of Josh, a senior manager at the shipping company. Later that week I called Josh, explained what my research was about and asked if I could go on a cruise. He said that they did not run cruise ships, but that they could take a serious passenger and asked me to explain everything in an email. This would enable him to explain to the crew the purpose of my visit. Below is the email I wrote:

From: Boersma, Asher
Sent: Friday 24 August 2018 10:11
To: <deleted>, Josh
Subject: joining the ship for research

Hello Josh,

as discussed over the phone just now below is a short explanation and dates when I am available.

Since 2015 I have been conducting academic research about inland navigation on the axis Rotterdam-Duisburg and focus on the interaction between control rooms and ships. This interaction I try to understand from both sides through observations in the control rooms and on the ships. I have already joined container ships, tankers, and barges. However, I haven't got to know the push boat practice.

As for my availability: the third week of September has my preference, my schedule is still empty from 17 until 21. Otherwise I have time in October too. I can embark both in the Netherlands and in Germany.

Thanks a lot for your cooperation.

Kind regards,
Asher Boersma

This email seemed to satisfy Josh. So, with our interests roughly aligned, the question was, when would there be room for me on board? That depended on when Harry was sailing—he works a two weeks on, two weeks off schedule—and if there was a cabin available. When we found a week that suited everyone, it was a matter of getting used to the rhythm of the ship. It travels between Rotterdam and Duisburg, but does not know when barges can be unloaded or picked up. In addition, the tides come into play closer to Rotterdam, so the speed of the ship varies. The week before I went on board, after the approximate date had changed four times, Josh gave me the ship's mobile phone number, which was usually answered by Harry or Pat (the other captain). Now I had to settle things with them. The first time I called, we agreed a provisional boarding time. I called every few days to see if anything had changed. To get to the ship, I had to take a taxi from Duisburg's main station to the harbour of the huge steelworks. Only one taxi driver was allowed on the site and he knew the way. Whenever the expected boarding time changed, I had to call the driver. He was aware of the provisional nature of these arrangements. Soon it looked as if I would have to board during the night, around 03.00. Pat could predict when they would reach Duisburg at their current speed, but not when they would actually be

called into port. Whenever that happened, I had a window of about 90 minutes to get there. He asked me to keep my mobile phone close to my bed. That way they could wake me if it changed again: “Later is not a problem, earlier is.” (Field note 11.10.18) The ship would not wait for me.

I was staying with a friend in Cologne and needed 120 minutes to get from his house to the port. This meant that Pat and Harry had to anticipate when they would be called, as the actual call would be too late for me. The night before Pat rang to say 11.00 was more likely, the head office had said they would have to wait at anchor. I was relieved as it meant I could get a good night’s sleep. I spoke to the taxi driver and agreed that I would confirm at 08.00 in the morning if 10.00 was the pick up time at the station. At 04.30 Pat called: if I wanted to board I had to get there right away. I checked the train connections and called him back to confirm that I would be going. On the way, at about 06.00, I called the taxi driver to ask if he could pick me up at 07.00. At 07.30 I was waiting on a quay in an industrial landscape that I only knew from the final showdown in an action film. A smaller boat came to pick me up. The *Tigris* was in the middle of the river, about to turn downstream with the current, when the smaller boat came so close that only a small step was needed to get on board. Harry, tall, broad-shouldered, bold, wearing a white buttoned shirt, stood there to welcome me on board.

We headed for Rotterdam straight away. Harry was at the helm, the crew busy tightening the barges, setting the lights, lowering the rudders. During the 180-degree manoeuvre to turn downstream, Harry gave the shipping company the numbers of the barges we were pushing, interrupted the phone call to tell the crew on their local radio to tighten port side, and was called on the marine VHF radio by another skipper who suggested a passing arrangement, which Harry refused. “That’s sweet of you, but we’re not going to do that,” he said to himself, appreciating the ability of the approaching skipper to recognise our limited manoeuvrability, but finding the suggestion too vague (Field note 11.10.18). Pusher boats have no bow thrusters, so they have to use the current and the wind to make elaborate manoeuvres, Harry explained. I took it all in, grateful and relieved to be there. It was not until 15.00, when sleep began to creep in, that I asked where my cabin was. Just before falling asleep, I texted my wife that I had actually made it on board.

Several members of the crew were clearly disappointed when they were informed of the sudden change of plans. First we were told to wait for 24 hours in the port of Rotterdam, which seemed unusual. The unprecedented water levels forced the company to reconsider the usual procedures. The news spread quickly among the crew. One helmsman made the offhand suggestion that family members could come over for a cup of coffee; they hadn’t seen them for 10 days. Pat dismissed the idea as impractical: they might be told to move on. Instead, plans were made for maintenance work, a young sailor would practice with his motorboat (which was tied to the stern of the push boat), and a meeting was arranged to brush up on safety

protocols. In the end, we left Rotterdam after just 14 hours. Harry and Pat took it as proof of the maxim: “The shore turns the ship.” (Field note 11.10.18)

The disappointment, accompanied by heartfelt curses, took me by surprise. I thought my relief and despair at navigating changing plans was due to my status as a newcomer to the improvised mobility “community of practice” (Lave 1991). Those who live on the water routinely improvise, to varying degrees. There are variations in water levels, behaviour, weather, market, tides, traffic, all of which trigger a response, albeit in different spatio-temporal dimensions. It was my mistake to think that just because they are able to improvise, they enjoy it all the time. Looking back, I can see moments when the skippers needed time to readjust, to digest the fact that they would not be going where they were going.

The announced 24-hour delay in the port of Rotterdam was due to low water levels. It forced the shipping company to improvise on an unprecedented scale. It had temporarily expanded its fleet by hiring a large number of barges and push combinations to keep metallurgical production going. These ships have a minimal draft, so they can cope better with a shallow river.

In general, low water means that many more ships are needed to transport the same volume—in this market, skippers make good money. In August 2018, I spent a few days in control rooms during low water. There were more ships on a narrower river, sailing at higher speed, afforded by their light loads. I heard a lot of swearing on the VHF frequencies; skippers demanding more space or taking too much, eager to get to the next lucrative cargo. The water would not rise significantly until late autumn. Records were being broken, and large parts of the Rhine were no longer navigable.

Back on the *Tigris*, it was night, when over the VHF marine radio the *Amalia* called. It wanted to pass us on the wrong side, on starboard, which requires a passing arrangement and the unfolding of blue boards with a blinking white light, hanging on the starboard side of the wheelhouse. The control room in Nijmegen had listened in and told the *Amalia* to “give a bit more room, this is a pusher” (Field note 13.10.18). This intervention was made possible by the superior radar network of the control room and the software functionality that allowed the operator to plot the *Amalia*'s probable course. The operator demonstrated an understanding of our manoeuvrability and our critical draught, preventing the *Amalia*, which was moving downstream at considerable speed, from taking what little water was left under our hull. By carrying transponders, by registering when entering control room sectors, by tuning into the relevant radio frequency, ships make themselves accountable. They can use radar to account for traffic in their vicinity. In this way, they become part of a “sociomaterial” (Braidotti 2002) assemblage in which they ultimately depend on their own and others' ability to identify with what is approaching. That the operator was able to do this, that he knew how to embody the relevant dimensions

and foresee the critical variables at stake, almost certainly points to previous skipper experience.

Many operators gave up a sailing life in exchange for a more sustained presence. In general, their families were already living a life on land. One operator explained that he made the choice for his marriage and to see his children grow up, another had no choice when his wife suffered a stroke and could no longer look after their teenage daughter alone. The coast had changed their lives. The birth of my first daughter also marked the end of my fieldwork.

After leaving the push boat, I emailed Harry to ask what they had meant by ‘the shore turns the ship’. I expected it to be part of a maritime idiom, but Harry wrote of a much more local use (Email 4.11.18). In the offices of the shipping company and the metallurgical parent company, plans are made which, in the eyes of Harry and his colleagues, often have practical shortcomings. When asked for input, the crews point this out—often to no avail. This leaves them disillusioned. The extent to which these plans depend on the distance between management and practice, between office and ship, between changing an Excel spreadsheet and having to make do with less crew, has remarkable parallels with the experience of operators. As will become clear, the wheelhouse and the control room have shared an ethos for decades, both rely increasingly on a very similar mediated vision, and in some cases both interact with a management class that has made unfamiliarity with established practice and practical knowledge a pillar of its ability to change practice itself.

One might think that aligning oneself with a control room is easier than with a ship. Logistically it is, the control room is static, but there are often significant obstacles to overcome. As a rule, I have visited all the control rooms I have passed while on board a ship, and vice versa: I have sailed the waters around every control room I have been in.

A voyage aboard the *Porter*, a tanker bound for Ghent, took us through the Western Scheldt, the Dutch estuary that connects the Belgian port of Antwerp to the North Sea. The control centres along this busy waterway share a transnational radar network—there are three Dutch control centres and one Belgian control centre in the port of Antwerp. When we reached the Terneuzen sector, the control room that manages the intersection of the Ghent-Terneuzen canal, Maria, the skipper, had to call in to register. Before entering the Western Scheldt through the Zandvliet lock in Antwerp, Maria and her husband Philip instructed the crew to secure all the hatches, I had to check the door to my cabin. The waves created by wind, tide and huge barges (the ones carrying containers that look more like a giant apartment block than a ship) made them nervous. Compared to other rivers, the waterscape is so vast that the optical identification of ships, with the aid of binoculars of course, is quite easy—weather permitting. Another complicating factor is the difference in speed: ocean-going vessels can travel three times as fast as barges, making it difficult to translate distance into time. Maria had to call three times – “Station

Terneuzen, *Porter*”—switching between different marine VHF radios they have as a backup (Field note 19.2.17). Finally, the Terneuzen control room answered. Maria said: “Yes, good morning, the *Porter*, passed buoy 32 and she is coming, eh, she is coming in.” (ibid.) Something inaudible (to my untrained ears) followed, which Maria took as confirmation.

I had heard stories about the Terneuzen control room from an operator who worked there, they were dramatically understaffed, morale was low, he told me. It would be difficult to get into that control room, I thought: why would they want a nosy researcher around? That, at least, had been my experience with the Dordrecht control room, and I had deduced that more controversy meant less access. I decided to give it a go, to see if I could get in touch with whoever was controlling access. The only contact I had in this region was a senior manager at Rijkswaterstaat, who had previously granted me access to another control room. She replied to my email by copying a local manager, who simply replied that I was welcome and to call before I arrived. It took me fewer attempts to get into the Terneuzen control room than it had taken Maria.

It had never been that easy, so I also tried to see if they could put me in touch with the Belgian control room, assuming they worked closely together. But the team leader had no contact there, and neither did his supervisor. There was, however, a person responsible for maintaining contact with both parties, who worked for an organisation set up by the Belgian and Dutch governments. He gave me a number and an e-mail address for the Antwerp control room. I wrote that “as inland navigation is not limited by national borders” I also wanted to visit them (Email 22.2.17). The senior operator replied the same day that “it’s normally no problem” but that I would have to make a formal request, including date and time, to his superior (Email 22.2.17). She was the head of all Vessel Traffic Services (VTS, the international nautical term for this type of control room) run by the Flemish government. After two emails and a phone call in which I stressed the international dimension of my project and the minimally invasive nature of my presence, she was convinced. I had to promise to come and present my results later.

My plan was to visit Terneuzen and Antwerp on two consecutive days. The former is a town on a strip of land that, apart from a tunnel under the Western Scheldt, has only one land connection with Belgium. To my surprise, I had found a city in the Netherlands that I could not reasonably reach by public transport in one day from Siegen, where I lived. The region is struggling with depopulation and is not only geographically but also politically peripheral in the Netherlands. I spent the night in a cheap hotel on the waterfront, where the other guests wore work clothes for breakfast. When I arrived at the gate shielding the control room premises, it was open, the intercom taped over with a piece of black garbage bag and the control room door, reinforced and guarded by CCTV, unlocked. The idea that something critical, presti-

gious and potentially vulnerable was being carried out here, as other Rijkswaterstaat control rooms suggest by their architecture, protocol and attitude, was absent.

Fred had been an operator at Terneuzen for more than 20 years, before which he had worked at a lock for 13 years. He had a minimised web browser on a screen to the far right of his console, which he checked occasionally. He was logged in to real-time stock market data—he trades himself. Basically, he was coordinating a huge T-junction, of which he was the only one who could clearly see who was approaching, thanks to his radar network. Ship radar is tied to a ship's position and cannot see around corners. Ships calling in were informed of the positions of other ships. The software, which overlays the radar with a nautical map, allows him to plot distances to the intersection, which he then translates into time. In the control rooms, where only inland navigation is coordinated, the speed is more homogeneous and distances are defined in metres.

When I asked him about the unguarded door, he shrugged his shoulders: they had no capacity to monitor the entrance. Going to the toilet was already an issue as the radio frequency had to be staffed permanently and the only colleague able to take over had then to abandon the other frequency. These were not unforeseen circumstances, according to Fred: “This is a deliberate policy” (Field note 6.4.17). The mouse on his console did not work properly, he cursed under his breath and wondered why they had to “work with such crap” (ibid.). Towards the end of my stay, Fred opened up a little. In other control rooms, operators were quick to voice their concerns. He explained that no new staff had been recruited for eight years, that overtime was no longer paid, and that there was no staff for the patrol vessel on the canal to Ghent. Occasionally there were nights when the control room was empty and the skippers were on their own—the local press had also reported this. At the locks on the canal, just behind the control room, staff were repeatedly dismissed after three years—“when they had finally gained experience”—to avoid giving them permanent contracts (ibid.). Fred felt that: “slowly everything is being demolished here, socially and physically” (ibid.). When he started working for Rijkswaterstaat more than 30 years ago, the organisation was “a bit boring and super reliable, now it is not boring and totally unreliable” (ibid.).

I was taken to the bus stop by another operator—the bus only ran once an hour. While I was waiting, I realised that in my twelve hours in the control room, no one had ever asked me what I did. In other control rooms I always had to declare my interest and my independence from management before anyone would open up, I had to show who I was aligned with. In those control rooms, not only was the entrance guarded, but the operators still had positions to defend within the larger organisation. To complain is to signal a transgression of a norm, a deviation from the desired state. In the case of the *Tigris*, they use the phrase ‘the shore is turning the ship’ to mark this transgression, implying that the shore should not be turning the ship. Fred and his colleagues resigned in who turned them.

The next day in Antwerp I had to be at a railway station at 06.45 in the morning. As with the *Tigris*, the practical alignment was left to me and those present. I had asked if there was a public transport connection—there was not. Terneuzen remained the only control room I could reach on foot. There would be a taxi there to take me and an operator to the control room. At 19.30, when the shift was over, we could share the taxi again. Although I arrived early enough, I soon discovered that there were taxi ranks at both exits and never found the operator or the taxi. Instead, I found a random taxi driver who took the fare as only his sat nav knew the address. We negotiated a fixed price, which worked out in my favour when we had to take a major detour that the driver was unaware of. An hour later, I was standing in front of a building on an island between two locks, one of them with a ship dwarfing all the surrounding buildings.

The Antwerp control room seemed to start in the corridor, the whole floor filled with consoles for traffic operators, pilot coordination and the port authority. They had planned a new building, the design was ready, but post-2008 austerity meant that the architect was bought out and an ad hoc renovation was carried out in the old building. The room had a majestic view of the docks and the entrance to the port, where the Scheldt river and its estuary, the Western Scheldt, meet. Marine VHF radio filled the room. I was greeted warmly and shown to a desk, and the chief operator said they would give me a tour when they had time.

Listening in, I noticed that most of the calls on the frequency were from inland waterway skippers. From sailing around the harbour—with Maria and Philip on the *Porter* and Rob and Rebecca on the *Liberty*—I knew that in the docks, between the seagoing vessels, barges came and went and every movement was anxiously recorded and accounted for, these skippers being aware of their vulnerability between much larger vessels. Inland navigation skippers were identifiable by their calls: they added greetings and used more syntax and were more tense than pilots. If a seagoing vessel made high waves, they would curse it, as Harry of the *Tigris* did when ships passed too close and too fast.

Thomas, a young operator of about 30, asked what I was doing. I told him about my project and he was curious about Dutch practices. When he heard that many Dutch operators had been skippers before, were proud of it and saw it as a key skill, he said that almost none of the Belgian operators had sailed before and added: “Air traffic control is not done by ex-pilots either.” (Field note 7.4.17)

When I joined an operator called Gunter at his console in the late afternoon, he also asked how Dutch and Belgian control rooms compare. In Belgium, I said, the skippers have more freedom to sort out passing arrangements between each other. Gunter replied that the Dutch were stricter, “in Antwerp a lot is possible.” (ibid.) Unlike Rijkswaterstaat or the Port of Rotterdam, only the Federal Police are responsible for enforcing maritime law. There are two agents on board a ship that they rent from another government agency, but which cannot sail autonomously. Gunter shows on

his radar that their ship is in the docks: "Very frustrating for these guys. Even if we gave instructions, all the skippers know that we can't really enforce our authority. Many of the official reports are cancelled." (ibid.)

Shortly afterwards, a vessel called to ask if the control room was in contact with a sailing yacht. It had made a dangerous manoeuvre, Gunter agreed. He had no contact with the yacht and it was not responding to his calls. Gunter took a pair of binoculars, had a look and then handed them over to me. Through the haze I saw a blue and white yacht, a push boat with four barges lashed onto it and suddenly steered clear of it at considerable speed. The yacht was unaccountable, the shore was definitely not turning it.

